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TIMELY SALVAGE CAN REDUCE LOSSES FROM BEECH SCALE-NECTRIA ATTACK

Beech is one of our more common hardwoods. It is an important component of the northern hardwood forest type, which occupies about 29 percent of the commercial forest land in the New England and Middle Atlantic States. In terms of total sawtimber volume, beech follows close on sugar maple, red oak, and yellow birch. It is used for a variety of products such as furniture, handles, flooring, containers, dowels, shuttles, and spools. In recent years, more beech has been used in woodpulp production; and with new processing techniques, it may become even more valuable for pulp. For these reasons, plus the growing emphasis on quality timber, forest managers should look carefully at their beech stands and this tree's most serious enemy: the beech scale-Nectria complex.

Beech Scale-Nectria Complex

The beech scale is a tiny, yellow insect, covered by a white woolly wax that it secretes. Light attacks of scale appear as isolated, white woolly dots on the bark of the tree, usually near the base. As infestation increases, the dots form thin vertical lines and then solid patches. Heavy infestations may completely cover the trunk and lower sides of branches with a whitish woolly mass.

The Nectria is a fungus. It appears on the bark as clusters of tiny, red, lemon-shaped fruiting bodies about the size of a pin head. These bodies first occur as single clusters, later in patches. When present in large numbers, they give a reddish tinge to the tree trunk.

Nature of Damage

As far as is known, neither organism alone will kill trees. The insect damages the bark cells by feeding. This causes the cells to dry out; and cracks appear in the bark, through which the Nectria gains entrance. The Nectria penetrates the cambium and sapwood, finally killing the tree by girdling. Thus both the scale and the fungus operating together are necessary to kill trees.

Distribution of Beech Scale-Nectria

Both the beech scale (insect) and the Nectria (fungus) are of European origin and were introduced into North America nearly 70 years ago. Scale was first found near Halifax, Nova Scotia, about 1890; and, although the Nectria was not discovered until 1929, it is suspected that both organisms arrived here together. During the past half-century, they have spread south and west throughout the Maritime Provinces of Canada, across Maine, into the White and Green Mountains of New Hampshire and Vermont, and down into the Catskills of New York.

The scale has been found in several localities in Massachusetts and Connecticut. In 1955 the Nectria was even noted on a tree in West Virginia. Thus far, neither scale nor Nectira has been found in Pennsylvania, although both occur in bordering Sullivan County, N.Y.

Extreme cold has apparently prevented spreading of the scale to the North. It has not been found in northern Maine or the Adirondacks.

Extent of Damage

Extensive mortality of beech has already occurred in Maine as a result of beech scale-Nectria attack. It has been estimated that about 24 percent of the beech in that state has been killed and another 16 percent is dying. In some small areas, 97 percent tree mortality has occurred. Heavily attacked beech in the White Mountains and the Catskills are already dying and extensive killing may be expected there in the near future. Tree killing seems imminent in certain sections of the Green Mountains.

Natural Control

Severe winter temperatures of -35°F and lower are lethal to beech scale. When such temperature extremes occur, practically all scales above the snow line are killed. No parasites of the scale are known, but a predaceous ladybird beetle is prevalent throughout the range of the insect.

Where scale infestation is light, this beetle appears capable of delaying buildup of the scale. But in heavy infestations, the beetle has little value as a controlling agent. Scale populations are usually heavier in dense forest stands than in open, park-like areas.

Chemical Control

Any attempt at chemical control of the scale would involve spraying the bark of individual infested beeches. Obviously, spraying commercial forest stands would be impractical because of the difficulty and expense of the operation. Tests have shown that the scale may be controlled with a number of chemicals--DDT, lime-sulphur, etc.--and under certain circumstances, such as in parks or areas of high recreational value, it is possible to protect trees by spraying.

Silvicultural Control

A study was undertaken in 1952 on the Bartlett Experimental Forest to determine if the scale population could be controlled by regulating the density of the stand. Within the experimental stand, several areas were opened up in varying degrees by removing from one-fifth to one-half of the basal area. In one section where one-half of the basal area was removed, the undergrowth was mowed. In all areas, little or no beech was cut.

At the time the study was started, heavy scale attack occurred on about one-third of the trees and light scale on the rest. No Nectria was found. Observations on scale and Nectria abundance have been made each fall since 1952.

In 1956, after 4 years, there was no indication that regulation of stand density (opening up the stand) had had any effect on scale abundance on trees heavily infested in 1952. On lightly infested trees, there was a slight reduction in scale population in heavily cut areas, particularly on smaller trees. In the medium and lightly cut areas, there was no apparent difference in scale abundance in 1956 than in an adjacent uncut stand.

During the first 4 years, regardless of the degree of cutting, Nectria increased on about four-fifths of the trees that had originally been heavily infested. Still, in the heavily cut areas fewer trees developed Nectria. This was quite noticeable on trees under 9 inches in diameter. And there was even a slight reduction in Nectria on some trees. But medium and light cuts apparently had no effect on Nectria abundance.

Observations made elsewhere in New Hampshire indicated that heavy thinning resulted in a slight reduction in the rate of increase of both organisms.

Thus, heavy scale infestation or Nectria infection was not markedly reduced by opening up the stand. And even in young beech stands, lightly infested with the scale, removal of about one-half of the basal area would be required to produce any beneficial results. Such a heavy cut might be of questionable silvicultural value in stands containing species, such as birch, that have a tendency to deteriorate after a heavy cut.

What Can Be Done?

So far no chemical or silvicultural methods have been developed for controlling the scale under forest conditions. But timber losses may be minimimized through timely salvage cuts. No precise time table for such cuttings can be given because buildup of both scale and Nectria depends on many circumstances. Probably the stand itself is most important: its location, site, and density; the size and age of the trees; and the severity of scale and Nectria attack at the time of discovery.

Certain general principles based on observations in unthinned stands on the Bartlett Experimental Forest may be followed:

- Salvage cuttings may be delayed for a period of 5 to 8 years after a light scale attack is first noticed.
- In areas where heavy scale is present, a high percentage of the trees will become infected with Nectria within 2 years and tree mortality may be expected soon thereafter. In such stands cutting should not be delayed more than 3 or 4 years after heavy scale attack is first observed.
- In areas where Nectria attack is already present, salvage cuts should be undertaken at once.

These three guide-lines are not intended to be the last word and may not suit all stands. However, they are offered as a general time table for salvage cuttings in stands where the beech scale or Nectria is found.

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